

Application Serial No.: 10/81⁴7,177
Reply to Office Action dated November 14, 2006

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1 and 3-16 are presently pending in this case, Claims 1 and 3-11 having been amended, Claim 2 having been canceled without prejudice or disclaimer, and Claims 12-16 having been added by way of the present Amendment. Care has been taken such that no new matter has been entered.

Claims 6-9 have been withdrawn from consideration.

In the outstanding Official Action, Claims 1-5, 10, and 11 were rejected under the non-statutory doctrine of obviousness-type double patenting over Claims 1-18 of U.S. Patent No. 6,258,858 (hereinafter referred to as "the '858 patent") or Claims 1-14 of U.S. Patent No. 6,281,254 (hereinafter referred to as "the '254 patent") in view of Brophy et al. (U.S. Patent No. 7,118,920). The Applicants respectfully request the withdrawal of the non-statutory double patenting rejections for the reasons discussed below.

Claim 1 of the present application recites a resin substrate comprising, among other features, a surface having a fluid supply port, a recess leading to the fluid supply port, and a bank adjacent to the recess, the bank having many micro grooves on a surface, which grooves form microchannels connecting an inside of the recess and an outside of the recess, wherein a contact angle of the surface of the resin substrate with respect to water is 5° to 60°.

The claims of the '858 patent do not recite a contact angle, nor do they recite a contact angle in the range specified in Claim 1 of the present application. In fact, the entire '858

patent does not discuss the issue of a contact angle.

Additionally, the claims of the '254 patent do not recite a contact angle, nor do they recite a contact angle in the range specified in Claim 1 of the present application. In fact, the entire '254 patent also does not discuss the issue of a contact angle.

The Brophy et al. reference describes the possible treatment or coating of microchannel walls in order to obtain a desired degree of hydrophobicity or hydrophilicity, and that the degree of hydrophobicity or hydrophilicity can be quantified using contact angle. (Column 11, line 64, through column 12, line 1.) The Brophy et al. reference also mentions in column 4, line 65, through column 5, line 11, the measurement of advancing contact angles for hydrophilic materials versus hydrophobic materials; however, note the statement on lines 6-11 of column 5.

The Brophy et al. reference does not disclose or even suggest a contact angle of a surface of a resin substrate with respect to water that is 5° to 60°, as is expressly recited in amended independent Claim 1 of the present application. The Brophy et al. reference clearly does not disclose or suggest such a range of contact angle, nor a reason for providing a contact angle within such a range. The present invention advantageously provides such a beneficial contact angle range for the reasons discussed throughout the application (see, e.g., page 11, lines 11-14, of the English translation of the specification).

Thus, the '858 patent and the '254 patent both do not claim (or even disclose) the claimed contact angle range, and the Brophy reference fails to supplement this deficiency because it also fails to disclose or even suggest such a contact angle range. Accordingly, the

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Applicants respectfully request the withdrawal of the non-statutory double patenting rejections of Claims 1-5, 10, and 11 of the present application.

Claims 1-5, 10, and 11 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Official Action indicated that the preamble in Claim 1 reciting “[a] resin microchannel substrate” renders the claims vague and indefinite. Claim 1 has been amended to clarify that “[a] resin substrate” is being claimed, thereby clearly indicating that the substrate is a “resin substrate” and that the resin substrate has a surface with the various features recited, such as a fluid supply port, a recess, a bank, and micro grooves. The Applicants submit that the amendments to Claim 1 have clarified the recitation therein, and therefore the Applicants respectfully request the withdrawal of the indefiniteness rejection.

Claims 1, 2, 4, 5, 10, and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over the ‘858 patent in view of Brophy et al. Claim 3 was rejected under 35 U.S.C. 103(a) as being unpatentable over the ‘858 patent in view of Brophy et al. and further in view of Gason et al. (U.S. Pub. No. 2005/0199500). For the reasons discussed below, the Applicants request the withdrawal of the obviousness rejections.

The basic requirements for establishing a *prima facie* case of obviousness as set forth in MPEP 2143 include (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) there must be a reasonable

expectation of success, and (3) the reference (or references when combined) must teach or suggest all of the claim limitations. The Applicants submit that a *prima facie* case of obviousness cannot be established in the present case because (1) the cited references, either when taken alone or in combination, do not teach or suggest all of the claim limitations, and (2) there is no suggestion or motivation to modify the references to arrive at the present invention absent hindsight considerations.

As noted above, Claim 1 of the present application recites a resin substrate comprising, among other features, a surface having a fluid supply port, a recess leading to the fluid supply port, and a bank adjacent to the recess, the bank having many micro grooves on a surface, which grooves form microchannels connecting an inside of the recess and an outside of the recess, wherein a contact angle of the surface of the resin substrate with respect to water is 5° to 60°. The '858 patent and the Brophy et al. reference, either when taken alone or in combination, do not teach or suggest a contact angle of a surface of a resin substrate with respect to water that is 5° to 60°, as recited in Claim 1.

The '858 patent does not discuss the issue of a contact angle. Thus, the '858 patent clearly does not disclose or suggest a contact angle of a surface of a resin substrate with respect to water that is 5° to 60°, as recited in Claim 1.

Additionally, as discussed above with respect to the non-statutory double patenting rejections, the Brophy et al. reference also fails to disclose contact angle of a surface of a resin substrate with respect to water that is 5° to 60°. While the Brophy et al. reference describes the possible treatment or coating of microchannel walls in order to obtain a desired

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degree of hydrophobicity or hydrophilicity, and that the degree of hydrophobicity or hydrophilicity can be quantified using contact angle (column 11, line 64, through column 12, line 1), the Brophy et al. reference does not disclose the claimed contact angle range or any reason why such a range would be desirable as compared to contact angles outside of the range. Thus, not only does the Brophy et al. reference fail to disclose such a feature, the Brophy et al. reference also fails to suggest the benefits or desirability of such a feature.

Accordingly, the Applicants submit that a *prima facie* case of obviousness cannot be established with respect to independent Claim 1 based on the cited references. Thus, the Applicants respectfully request the withdrawal of the obviousness rejection of independent Claim 1.

The dependent claims are considered allowable for the reasons advanced for Claim 1 from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed nor suggested by the applied references when those features are considered within the context of Claim 1.

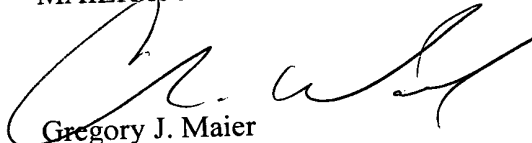
Newly added Claims 12-16 are believed to be in condition for allowance as they recite features that are not disclosed or suggested by the cited art. For example, new independent Claim 12 recites a microchannel apparatus comprising, among other features, a resin substrate having a surface, wherein the surface of the resin substrate has a contact angle with respect to water of 5° to 60°.

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Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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